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*Ben*

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EXAMINER

RAO, S

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/17/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

08/930,449

Applicant(s)

Abe et al.

Examiner

S.H. Rao

Group Art Unit

2814



☒ Responsive to communication(s) filed on Sep 10, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1035 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claim

☒ Claim(s) 1 to 62 is/are pending in the application

Of the above, claim(s) 19, 24, 29, 34, 39, 44, 45, 50 to 55 is/are withdrawn from consideration

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-11, 12-18, 20-23, 25-28, 30-33, 35-38, 40-43, 46-49 and 56-62 is/are rejected.

☒ Claim(s) 3, 40-43 and 58 is/are objected to.

☒ Claims 1-62 are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 1

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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## **DETAILED ACTION**

### ***Specification***

#### **1. Content of Specification**

The specification (including the substitute specification) does not contain a section entitled, “Brief Description of the Several Views of the Drawing(s)” as required. See Brief Description of the Several Views of the Drawing(s): A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74. Correction is required.

### ***Claim Objections***

2. Claim 3 is objected to because of the following informalities: In the preliminary Amendment filed September 30, 1997 page 1 of the amendment recites line 1 of claim 3. Further on page 2 thereof the entire claim 3 including the first line on page 1 is repeated. Any one of afore mentioned line 1 of claim 3 must be deleted. Appropriate correction is required.

Claims 40,(41-43) and 58 are objected to because claims 40 and 58 contain the word, “substantially”. As the same direction referred to in claim 40 and the position referred to in claim 58 are not adequately described in the specification so that the limits of the direction or position can be ascertained therefrom and the prior art cannot supply these parameters, this renders these claims indefinite. Claims 41-43 depend from objected to claim 41 and are objected to for that reason. Applicants may delete the word “substantially” from these claims.

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3. Claims 1-62 were pending. In response to a restriction requirement Applicants elected with traverse claims 1-11,12-18, 20-23,25-28,30-33,35-38,40-43,46-49 and 56-62. Claims 19, 24,29,34,39,45,50 and 55 are withdrawn.

For reasons stated under the , "Response to the arguments " section herein, the **restriction requirement is made Final.**

***Claim Rejections - 35 U.S.C. § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-18 and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Zang et al. (U.S. Patent No. : 5,403,772, herein after Zang).

With respect to claim 1, Zang in col.4, lines 40-45 discloses :

A method of forming a crystalline film on a substrate by (a) forming a thin film on a substrate and (b) crystallizing at least a surface layer of the thin film in a hydrogen containing atmosphere, such that at least the surface layer of the thin film is melted and crystallized.

With respect to claim 2, Zang in addition to the disclosure stated under claim 1 above, in col.4, lines 40-45 discloses the thin film being a semiconductor film.

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With respect to claim 3, Zang in addition to the disclosure stated under claim 1 above, in Col.4, lines 30-34 discloses the thin film to be a metallic thin film.

With respect to claim 4, Zang in addition to the disclosure stated under claim 1 above, inherently discloses ( because when the disclosure does not state a specific atmospheric condition, it is understood by one of ordinary skill in the art that atmospheric conditions are used). The crystallization being carried out under atmospheric pressure.

With respect to claim 5, Zang in addition to the disclosure stated under claim 1 above, in Col.19, lines 18-21 discloses the method of forming a crystalline film in a hydrogen containing atmosphere which contains an inert gas and hydrogen molecules. The recitation, “ at least the surface layer of the thin film is melted and crystallized” can not be given any patentable weight because the phrase merely recites an inherent feature namely results the results that will occur when the method step of crystallization is carried out. Therefore no patentable weight can be given to this recitation of an inherent feature.

With respect to claim 6, Zang in addition to the disclosure stated under claim 1 above, discloses in Col.20, lines 64-66 the Hydrogen containing atmosphere to contain an inert gas and a hydrogen halide.

With respect to claims 7 and 8, Zang in addition to the disclosure stated under claim 6 above, discloses in Col. 19 lines 18-21 that the inert gas is a rare gas namely Argon.

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With respect to claims 9 and 10, Zang in addition to the disclosure stated under claim 8 above, discloses in Col. 19, line 18 discloses the melting step carried out by a high energy light source.

With respect to claim 11, Zang in addition to the disclosure stated under claim 9 above, discloses in Col. 13, lines 50-52 discloses the melting step carried out by a high energy laser beam source.

With respect to claim 12, Zang in addition to the disclosure stated under claim 1 above, discloses in Col. 9, lines 10-15 the crystallization being carried out in a gaseous atmosphere containing a component element of the semiconductor thin film.

With respect to claim 13, Zang in addition to the disclosure stated under claim 12 above, inherently discloses ( because when the disclosure does not state a specific atmospheric condition, it is understood by one of ordinary skill in the art that atmospheric conditions are used), the crystallization being carried out under atmospheric pressure.

With respect to claim 14, Zang in addition to the disclosure stated under claim 12 above, discloses in Col. 9, lines 10-15 the crystallization being carried out in a gaseous atmosphere containing a hydride component element of the semiconductor thin film.

With respect to claim 15, Zang in addition to the disclosure stated under claim 12 above, discloses in Col. 7, the thin film being a silicon thin film and the gas containing the component element of the semiconductor thin film to be silane.

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With respect to claims 16 and 17, Zang in addition to the disclosure stated under claims 12 and 16, discloses in Col. 19, line 18 discloses the melting step carried out by a high energy light source.

With respect to claim 18, Zang in addition to the disclosure stated under claim 16 above, in Col. 13, lines 50-52 discloses the melting step carried out by a high energy laser beam source.

With respect to claim 62, in addition to the disclosure stated under claim 1 above, Zang discloses a thin film electronic device formed by a method of forming a crystalline film on a substrate by (a) forming a thin film on a substrate and (b) crystallizing at least a surface layer of the thin film in a hydrogen containing atmosphere. (See Zang Fig. 8 B and 11 D).

5. Claims 20-23, 25-28, 30-33, 35-38, 46-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (U.S. Patent No. 5,200,630, herein after Nakamura).

With respect to Claim 20, Nakamura in Fig.6 and Col. 4, lines 39 to Col. 5, lines 11 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and a supply chamber . The supply chamber includes an introduction window that introduces the high energy into the supply chamber . The high energy is supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film.

With respect to claim 21, Nakamura in addition to the disclosure stated under claim 20 above, in Fig. 6 discloses the thin film being a semiconductor film

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With respect to claim 22, Nakamura in addition to the disclosure stated under claim 20 above, in col.2, lines 60-68 discloses the thin film being a metallic film (see also the disclosure under claim 3 above).

With respect to claim 23, Nakamura in addition to the disclosure stated under claim 20 above, in col.4, lines 45-50 discloses the high energy source is light.

With respect to Claim 25, Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and a supply chamber . The supply chamber includes an introduction window that introduces the high energy into the supply chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film, wherein the distance between the introduction window and the thin film is larger than the shortest distance between the wall and the thin film.

With respect to claim 26-28, Nakamura in addition to the disclosure stated under claim 25 above discloses as stated under claims 21-23 above , all the limitations of claims 26 to 28. (See also disclosure under claims 2-4).

With respect to Claim 30, Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and supply chamber . The supply chamber includes an introduction window that introduces the high energy into the supply



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chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film and wherein the pressure in the vicinity of the introduction window is higher (atmospheric) than the pressure (Vacuum) in the vicinity of the thin film in the supply chamber. (See also Col. 4, line 57).

With respect to claim 31-33, Nakamura in addition to the disclosure stated under claim 30 above discloses as stated under claims 21-23 above, all the limitations of claims 31 to 33. (See also disclosure under claims 2-4).

With respect to Claim 35, Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and a supply chamber . The supply chamber including an introduction window that introduces the high energy into the supply chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film, and the supply chamber also has an exhaust port wherein the pressure in the vicinity of the introduction window is higher (atmospheric) than the pressure (Vacuum) in the vicinity of the thin film in the supply chamber. (See also Col. 4, line 57). The recitation , “a pressure in a vicinity of the thin film higher than the pressure in a vicinity of the exhaust port in the supply chamber.” will inherently occur when the air in the supply chamber is exhausted.

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With respect to claim 36-38, Nakamura in addition to the disclosure stated under claim 35 above discloses as stated under claims 21-23 above, all the limitations of claims 36 to 38. (See also disclosure under claims 2-4).

With respect to Claim 46, Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and supply chamber . The supply chamber including an introduction window that introduces the high energy into the supply chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film, wherein the high energy is supplied to the thin film in direction normal to the thin film, that is shifted from the direction of the irradiation path.

With respect to claim 47-49, Nakamura in addition to the disclosure stated under claim 46 above discloses as stated under claims 21-23, above all the limitations of claims 47 to 49. (See also disclosure under claims 2-4).

***Claim Rejections - 35 U.S.C. § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 40-43, 56-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura as applied to claim 35 above, and further in view of Japanese patent No. 62-3809 (herein after JP-3809). (Submitted by applicants in their IDS).

With respect to Claim 40, Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and supply chamber . The supply chamber including an introduction window that introduces the high energy into the supply chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film, wherein the high energy is irradiated along an irradiation path in the supply chamber. Further the high energy is supplied with a gas flow in substantially the same path as the irradiation path and the gas flow from the thin film is the same direction as the reflection path.

Nakamura discloses all the method steps recited in claim 40 as stated above.

Nakamura does not disclose a part of the high energy being reflected from a thin film itself.

JP-3809 discloses in figures 1,3,5 and 6 disclose a part of the high energy being reflected from a thin film itself.

Nakamura and JP-3809 are analogous art because they are from the same field of endeavor, namely method of forming a crystalline film for a thin film electronic device.

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At the time the of the invention, it would have been obvious to a person of ordinary skill in the art to substitute JP-3809's reflective thin film in Nakamura's method steps.

The motivation for doing so would have been to form, "a semiconductor device in which a configuration of neighborhood of crystal grain boundaries of a semiconductor layer and an insulating film is improved such that not only the mobility of carriers in channels but yield is raised". Controlling the laser by partially reflecting it provides a better grain boundary. (Nakamura Col.1, lines 52-57).

Therefore it would have been obvious to combine Nakamura and JP-3809 to obtain the invention as specified in claims 40-43.

With respect to claim 41-43, Nakamura in addition to the disclosure stated under claim 30 above discloses as stated under claims 21-23 above all the limitations of claims 41 to 43. (See also disclosure under claims 2-4).

7. With respect to Claims 56 57, and 58 Nakamura in figs.1 to 3 and 6 discloses forming a crystallized thin film on a substrate by high energy crystallization in a high energy supply apparatus which includes a generation source for generating a high energy and a supply chamber . The supply chamber including an introduction window that introduces the high energy into the supply chamber . The high energy being supplied to the thin film that is set in the supply chamber through the window that is disposed at a location resistant to adherence of components of the thin film, wherein the high energy is irradiated along an irradiation path in the supply chamber. JP-3809 in figs. 1,3,5 and 6 discloses the irradiation of the first position with the high energy

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irradiation and the irradiation of the second position with the reflected energy formed by a course change of the reflected high energy irradiation. Fig. 6 discloses the irradiation of the second position by the reflected laser starts when the irradiation in the first position starts. Nakamura also discloses in Fig. 6 the first and second positions being the same. The motivation to combine the references sated above under claim 40 is incorporated by reference here.

With respect to claim 59-61, Nakamura in addition to the disclosure stated under claim 30 above discloses as stated under claims 21-23 above, all the limitations of claims 59 to 61. (See also disclosure under claims 2-4).

### *Response to Arguments*

8. Applicants citing MPEP Section 803, argue that the patent office has not established the burden that will be imposed on the Patent Office if restriction was not maintained between Groups I and II .

It is believed that Applicants have misstated the MPEP Sections, as the present case is filed under 35 U.S.C. Section 371, as stated in MPEP Section 801 Chapter 800 is inapplicable to applications entering the National stage under 35 U.S.C. 371. Assuming applicants mean Chapter 1800 the following is the response .

Contrary to applicants ' contentions the Examiner has established the serious burden that will be placed on the Office for the following reasons :

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a) The Examiner has shown the inventions lack unity (applicants have agreed to this). The two inventions require search in two entirely different areas and would cause a very serious burden on the Examiner/Office to examine two inventions in such diverse classes/areas.

Therefore the Office has demonstrated beyond a doubt that it will be unduly burdened.

Assuming *arguendo* MPEP Chapter 800 is applicable the examiner has established that the inventions in groups I and II are classified in entirely different areas. Eg. Group I-Classes 438/ 158 and group II-118/723 Fe and 118/ 723 MP. Under MPEP Section 808.02 (A) Separate Classification, “shows that each distinct subject has attained recognition in the art as a separate subject for inventive effort, and also a separate field of search”. Therefore, the Office has more than met its burden.

b) Additionally, applicants arguments about delay and expenses are not relevant to the restriction/unity of invention . Therefore after careful review none of the applicants arguments for reconsideration and removal of the restriction requirement can be granted.

**Therefore the restriction requirement is made FINAL.**

#### ***Conclusion***

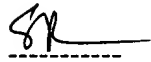
16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Steven H. Rao whose telephone number is (703) 306-5945. The fax number is (703) 308-7722 or -7724. The Examiner can be normally reached on Monday-Friday from 9.30 a.m. to 6.00 p.m. (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor (SP) Olik Chaudhuri, can be reached at (703) 306-2794.

17. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission at the above mentioned fax numbers.

18. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology center 2800 receptionist at (703) 308-0956.

  
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November 04,1999.

  
Olik Chaudhuri  
Supervisory Patent Examiner  
Technology Center 2800